**[0074]** Referring to FIG. **5**, in operation **500**, a priority order of loads is set. Here, the priority order may be randomly set by a user. In an operation **502**, it is determined whether or not an amount of power stored in a battery is above a first critical power amount. In the case where the amount of power stored in the battery is above the first critical power amount, power is provided to all loads regardless of the priority order (operation **504**). In the case (operation **506**) where the amount of power stored in the battery is less than the first critical power amount, power is provided to a first priority load and a second priority load, and power provided to a third priority load is blocked. For example, in the case where power charged to a battery is above 90% of the entire capacity of the battery, the switches **154** through **156** are turned on to provide power to all DC loads. In the case where power charged to the battery is below 90% of the entire capacity of the battery, only the switches **154** through **155** are turned on, and the switch **156** is turned off to block power provided to the third priority load.

**[0075]** In an operation **508**, it is determined whether or not the amount of power stored in the battery is above a second critical power amount. In the case where the amount of power stored in the battery is above the second critical power amount, power is provided only to the first priority load and the second priority load (operation **512**). In the case where the amount of power stored in the battery is less than the second critical power amount, power is provided only to the first priority load (operation **510**). For example, in the case where power charged to the battery is below 50% of the entire capacity of the battery, only the switch **154** is turned on and the other switches **155** through **156** are turned off, so that power is provided to the first priority load, and power provided to the second and third priority loads is blocked.

**[0076]** In an operation **514**, it is determined whether or not the amount of power stored in the battery is above a third critical power amount. In the case where the amount of power stored in the battery is above the third critical power amount, power is provided only to the first priority load (operation **518**). In the case where the amount of power stored in the battery is less than the third critical power amount, power provided to all loads are blocked. For example, in the case where power charged to the battery is below 10% of the entire capacity of the battery, power provided to all loads are blocked to prevent the battery from being completely discharged. Therefore, the grid-connected energy storage system **100** may operate stably. Accordingly, by selectively providing power to loads, for which a priority order is set up, based on remaining power of a battery, power may be provided to a load, which is preferentially desired by a user, for a longer period of time, and thus efficiency of energy usage may be improved.

**[0077]** As described above, according to one or more of the above embodiments of the present invention, an energy storage system according to an embodiment of the present invention may utilize power stored in a battery at improved efficiency even in case of power interruption.

**[0078]** It should be understood that the exemplary embodiments described herein should be considered in a descriptive sense only and not for purposes of limitation, but, on the contrary, it is intended to cover various modifications and equivalent arrangements within the spirit and scope of the appended claims and their equivalents. Descriptions of features or aspects within each embodiment should typically be considered as available for other similar features or aspects in other embodiments.

What is claimed is:

**1**. An energy storage system comprising:

a maximum power point tracking (MPPT) converter for converting power generated by a renewable energy generating system and outputting the converted power to a first node;

a bi-directional inverter coupled between the first node and a second node, a grid and a load being coupled to the second node, the bi-directional inverter for converting a first power input via the first node to a second power and outputting the converted second power to the second node, and converting power provided by the grid to the first power and outputting the converted first power to the first node;

a battery for storing a third power;

a bi-directional converter coupled between the battery and the first node, the bi-directional converter for converting the third power output by the battery to the first power and outputting the converted first power to the bi-directional inverter via the first node, and converting the first power output by the bi-directional inverter via the first node to the third power and storing the converted third power in the battery; and

an integrated controller for providing the third power to the load based on a priority order.

**2**. The energy storage system of claim **1**, wherein the integrated controller is configured to provide the third power stored in the battery to the load based on an amount of the third power stored in the battery and the priority order of the load.

**3**. The energy storage system of claim **1**, wherein the integrated controller is configured to selectively provide the third power to the load based on the priority order of the load if a power interruption signal is received by the energy storage system.

**4**. The energy storage system of claim **1**, further comprising:

a first switch between the bi-directional inverter and the load; and

a second switch between the second node and the grid.

**5**. The energy storage system of claim **4**, wherein the integrated controller is configured to turn off the second switch when the power interruption signal is received.

**6**. The energy storage system of claim **1**, wherein the load comprises at least two loads, further comprising at least two switches coupled between the second node and the at least two loads, the at least two switches for controlling power to be provided to the at least two loads, respectively,

wherein the integrated controller is configured to control the at least two switches based on an amount of the third power stored in the battery and a priority order of the at least two loads.

**7**. The energy storage system of claim **1**, wherein the load comprises at least two loads, and the integrated controller comprises:

a monitor for monitoring an amount of the third power stored in the battery;

a user setup unit for setting up the priority order of the at least two loads;